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DIGITAL TRANSFORMATION INITIATIVES AND COMPETITIVE ADVANTAGE IN THE AIRLINE INDUSTRY: A CASE STUDY OF KENYA AIRWAYS

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ABSTRACT
The airline industry is increasingly adopting digital transformation to enhance competitiveness, improve operational efficiency, and enrich customer experiences. This study investigated the effect of digital transformation initiatives on competitive advantage in the airline industry, focusing on Kenya Airways. Anchored on the Technology Acceptance Model (TAM), the research adopted a mixed-methods design with a census survey of 180 employees drawn from operations, customer service, information technology, marketing, and corporate affairs departments. Data were collected through structured questionnaires, validated through expert review and pilot testing, and analysed using descriptive statistics, Pearson correlation, and multiple regression. The results showed that digital transformation had the strongest and most significant influence on competitive advantage ($r = 0.748$, $p < 0.01$; $\beta = 0.328$, $p < 0.001$). Adoption of mobile and web platforms, automation of service delivery, AI/chatbots use, and digital engagement metrics were positively linked to operational efficiency, customer satisfaction, and brand positioning. The findings align with global evidence that digital tools transform customer engagement and efficiency in the aviation sector. The study concludes that digital transformation is a strategic lever for competitive positioning in Kenya's aviation industry and recommends that Kenya Airways strengthen investments in automation, user-friendly platforms, staff digital training, and AI-powered solutions.
Keywords: *Digital Transformation, Competitive Advantage, Technology Acceptance Model, Kenya Airways, Airline Industry*

INTRODUCTION
The global airline industry is undergoing rapid transformation driven by technological innovations, evolving customer expectations, and intensifying competitive pressures. Digital transformation has emerged as a strategic imperative for airlines seeking to improve operational efficiency, enhance customer engagement, and strengthen their competitive positioning. Globally, major carriers such as Delta Airlines, Lufthansa, and Singapore Airlines have redefined their business models by adopting digital tools, including predictive analytics, mobile applications, self-service kiosks, and artificial intelligence-powered customer support systems (Lee et al., 2020; Singh & Hess, 2017). These technologies have enabled airlines to streamline operations, reduce costs, and deliver more personalized customer experiences, thereby creating a sustainable competitive edge in highly dynamic markets. For instance, Delta's biometric boarding systems and Lufthansa's AI-driven ticketing have significantly improved service agility and customer satisfaction while simultaneously reducing operational bottlenecks.

In the regional context, the African aviation sector has increasingly recognized the strategic importance of digital transformation in sustaining competitiveness. Ethiopian Airlines, for example, has invested heavily in digital marketing, real-time flight tracking, and automated service platforms to consolidate its dominance in the continent's air transport market (Mwaura et al., 2022). Nevertheless, most African carriers face challenges such as limited infrastructure, high capital investment requirements, and weak regulatory frameworks, which have slowed the pace of digital adoption. These limitations have hindered the ability of airlines to fully exploit digital tools for competitive advantage, creating significant disparities between African carriers and their global counterparts.

In Kenya, the aviation sector is a critical contributor to economic development, accounting for approximately 4.6% of GDP and supporting over half a million jobs through direct and indirect impacts (Kenya Civil Aviation Authority, 2023). Kenya Airways (KQ), the country's flagship carrier, has made strides toward adopting digital solutions, including mobile booking applications, automated check-in systems, and customer service chatbots. These initiatives were introduced to enhance service efficiency and improve customer satisfaction as part of the airline's turnaround strategies. However, despite these efforts, Kenya Airways has continued to record financial losses, operational inefficiencies, and competitive threats from regional and international carriers (KQ Financial Report, 2023). This raises critical questions regarding the extent to which digital transformation initiatives have translated into tangible competitive advantage for the airline.

Although global evidence demonstrates that digital transformation can significantly improve competitiveness, empirical studies in the Kenyan context remain limited, fragmented, or focused primarily on operational efficiency rather than competitive advantage (Kariuki & Njoroge, 2022). Moreover, many studies in Africa examine digital transformation alongside other strategic variables, making it difficult to isolate its independent effect on competitiveness (Mwaura et al., 2022). This reflects both a contextual and methodological gap in the existing literature.

This study therefore, seeks to examine the effect of digital transformation initiatives on competitive advantage in the airline industry, using Kenya Airways as a case study. The findings provide theoretical insights and practical guidance on how digital adoption can be leveraged by African carriers to enhance efficiency, customer satisfaction, and sustainable market positioning.

STATEMENT OF THE PROBLEM

The global airline industry operates in a highly volatile and uncertain environment characterized by thin profit margins, fluctuating fuel prices, technological disruptions, and ever-changing customer expectations. In 2023, the International Air Transport Association (IATA) reported that although global airline revenues surpassed USD 800 billion, only 4.7% translated into net profit, underscoring the fragile sustainability of the industry (IATA, 2023). Leading global carriers such as Delta, Emirates, and Singapore Airlines have responded to these challenges by investing heavily in digital transformation initiatives, including biometric boarding, AI-enabled customer service, predictive analytics, and mobile applications. These innovations have allowed them to reduce costs, improve service quality, and strengthen long-term competitiveness (Lee et al., 2020; Singh & Hess, 2017).

In contrast, many African airlines have struggled to maintain competitiveness due to limited technological infrastructure, weak financial capacity, and slow adoption of digital innovations. Although success stories such as Ethiopian Airlines demonstrate that strategic digital transformation can enhance operational efficiency and customer loyalty, most African carriers remain burdened by inefficiencies and overreliance on traditional systems (Mwaura et al., 2022). This has created a regional disparity where African airlines often lag behind their global counterparts in leveraging digital solutions for sustainable competitive advantage.

Kenya Airways (KQ), the national carrier and a key player in East Africa's aviation sector, reflects these challenges. Despite introducing mobile booking platforms, self-service check-in systems, and AI-powered customer support, the airline continues to report financial losses and eroded market share. In 2022, KQ recorded a KES 21.7 billion loss despite restructuring efforts, raising concerns about the effectiveness of its strategic turnaround programs (KQ Financial Report, 2023). Most of its recovery initiatives have emphasized debt restructuring and fleet rationalization while placing less emphasis on integrating digital transformation as a core strategic driver of competitiveness.

Empirical literature in Kenya remains limited and fragmented, with most studies focusing on operational efficiency rather than competitive positioning (Kariuki & Njoroge, 2022; Musyoka & Kamau, 2021). Additionally, many previous studies in Africa have examined digital transformation alongside other strategic variables, making it difficult to isolate its independent contribution to competitiveness (Mwaura et al., 2022). This presents a contextual, conceptual, and methodological gap, as robust data-driven evidence on the direct impact of digital transformation initiatives on competitive advantage in the Kenyan airline industry is scarce. By addressing this gap, the research provides both theoretical insights and practical recommendations to guide managers, policymakers, and stakeholders in leveraging digital adoption as a critical pathway to sustainable competitiveness in Kenya's aviation sector.

OBJECTIVE

To examine the influence of digital transformation initiatives on competitive advantage in the airline industry: A case study of Kenya Airways.

RESEARCH QUESTION

What is the influence of digital transformation initiatives on competitive advantage in the airline industry, with specific reference to Kenya Airways?

SIGNIFICANCE OF THE STUDY

This study is important because it offers practical guidance to managers and decision-makers at Kenya Airways and other airlines on how digital transformation initiatives can drive competitive advantage. By focusing on tools such as mobile platforms, automation, artificial intelligence, and digital engagement, the research provides evidence on how these technologies enhance operational efficiency, reduce costs, and improve customer satisfaction. The findings will therefore help airlines allocate resources more effectively, design customer-centric strategies, and strengthen their overall market positioning.

Beyond managerial use, the study has value for policymakers, scholars, and customers. For regulators such as the Kenya Civil Aviation Authority, the results provide insights for developing supportive policies that promote digital innovation and strengthen Kenya's role as a regional aviation hub. Academically, the research enriches the body of knowledge on digital transformation and competitive advantage, especially within African aviation where empirical evidence is still limited. Customers also benefit, as improved digital platforms translate into more seamless booking, faster service, real-time information, and greater satisfaction, ultimately boosting trust in Kenya Airways.

LITERATURE REVIEW

Theoretical Review

Technology Acceptance Model (TAM)

This study was anchored on the Technology Acceptance Model (TAM) developed by Davis (1989). The model provides a theoretical framework for understanding how individuals accept and use new technologies. TAM is grounded on two key constructs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived usefulness refers to the extent to which an individual believes that using a particular technology will improve their performance, while perceived ease of use refers to the degree to which a person believes that using the technology will be free from effort. According to the model, these two constructs influence users' attitudes toward technology, which subsequently determine their behavioral intention to use, and ultimately, actual adoption of the technology.

Over time, TAM has been expanded to include additional variables. TAM2 (Venkatesh & Davis, 2000) incorporated social influence and cognitive instrumental processes, while the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) integrated further determinants such as facilitating conditions and organizational support. Although the model has been criticized for oversimplifying complex socio-cultural and organizational factors (Bagozzi, 2007), it has been widely applied across different sectors due to its predictive power and practical applicability in explaining technology adoption.
The relevance of TAM to this study lies in its application to digital transformation initiatives within the airline industry. Kenya Airways' adoption of mobile booking applications, self-service kiosks, automated check-in systems, and AI-powered customer service platforms can be effectively analysed using TAM. Customers who perceive these technologies as easy to use and beneficial are more likely to adopt them, resulting in improved satisfaction and loyalty. Likewise, employees who view these tools as useful and manageable are more inclined to embrace them in service delivery, leading to greater operational efficiency. In this way, TAM provides a strong theoretical foundation for examining how digital transformation initiatives contribute to Kenya Airways' competitive advantage.

Empirical Literature Review

Globally, studies show that digital transformation has become a cornerstone of competitiveness in the airline industry. Singh and Hess (2017) investigated European carriers and found that airlines leveraging artificial intelligence, big data analytics, and mobile applications significantly improved customer satisfaction and operational agility. Similarly, Lee, Kim, and Park (2020), in a study on Asian airlines, demonstrated that predictive analytics and mobile platforms enhanced personalization of services and service responsiveness, creating a distinct competitive edge. Westerman, Bonnet, and McAfee

(2011) further confirmed that digital leaders across industries, including aviation, consistently outperformed competitors in market share and profitability. However, these global studies were conducted in contexts with advanced technological infrastructure, leaving a gap in understanding how digital transformation functions in less-developed regions such as Africa.

At the regional level, evidence suggests that African airlines are making strides in digital adoption, albeit at a slower pace. Mwaura, Kamau, and Omondi (2022) established that East African airlines using mobile booking platforms, real-time flight tracking, and digital marketing reported higher customer loyalty and stronger brand positioning. Similarly, Girma (2020), studying Ethiopian Airlines, found that the integration of automated systems and digital engagement platforms improved efficiency and reinforced its competitive dominance in Africa. Despite these positive outcomes, regional studies highlight that many African airlines face challenges including limited investment capacity, underdeveloped ICT infrastructure, and weak regulatory frameworks, which hinder the full realization of digital transformation benefits.

In the Kenyan context, empirical evidence is emerging but remains fragmented. Kariuki and Njoroge (2022) revealed that the adoption of mobile check-in systems and online booking platforms improved service convenience and operational efficiency in Kenyan airlines, but the study did not directly link these improvements to competitive advantage. Musyoka and Kamau (2021) emphasized that digital engagement tools enhanced customer satisfaction, yet their analysis was limited to customer experience without addressing organizational competitiveness. More recently, Mwangi (2023) examined digital platforms in the Kenyan aviation sector and found a positive relationship with customer loyalty but highlighted challenges such as inadequate staff training and low adoption rates of advanced technologies like AI. Collectively, these studies underscore a methodological and contextual gap, as most focus narrowly on efficiency and satisfaction without isolating the role of digital transformation initiatives in driving competitive advantage.

This study therefore contributes to bridging these gaps by empirically examining the direct effect of digital transformation initiatives on competitive advantage in Kenya Airways. By doing so, it extends global and regional findings to the Kenyan context and offers new insights into how technology adoption can be strategically leveraged to improve competitiveness in African aviation.

METHODOLOGY

The study adopted a mixed-methods research design, integrating both quantitative and qualitative approaches. This design was appropriate as it allowed for the collection of measurable data on digital transformation initiatives while also capturing contextual insights from respondents. The quantitative approach facilitated the testing of the relationship between digital transformation initiatives and competitive advantage, while the qualitative approach enriched interpretation through open-ended responses. The target population comprised 180 employees of Kenya Airways, drawn from five core departments: operations, customer service, information technology, marketing, and corporate affairs. These departments were selected because they are directly involved in strategy formulation, technology adoption, and service delivery, making them well positioned to provide reliable data on digital transformation initiatives.

The study adopted a census approach, meaning all 180 employees in the target population were included in the study. The census method was justified given the manageable population size and the need for comprehensive data that represents the perspectives of all relevant departments. Primary data were collected using a structured questionnaire containing both closed-ended and open-ended items. Closed-ended items were measured using a five-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree," capturing perceptions of digital transformation and competitiveness. Open-ended questions allowed respondents to provide additional qualitative insights. The instrument was validated through expert review by academic supervisors and aviation industry specialists. A pilot study involving 18 employees (10% of the population) was conducted to refine clarity, reliability, and validity.

Reliability was tested using Cronbach's Alpha, with results above 0.86 for all constructs, exceeding the recommended threshold of 0.70 (Nunnally, 1978). This confirmed internal consistency of the questionnaire. Content validity was ensured by aligning items to research objectives, while construct validity was established through expert review and pilot testing. The researcher obtained necessary approvals from relevant university authorities and Kenya Airways management before administering the questionnaires. Respondents were assured of confidentiality, anonymity, and voluntary participation. Questionnaires were self-administered to allow respondents adequate time for completion. Quantitative data were analysed using the Statistical Package for Social Sciences (SPSS version 28). Descriptive statistics (means, frequencies, and standard deviations) were used to summarize responses. Pearson correlation analysis measured the strength and direction of the relationship between digital transformation initiatives and competitive advantage, while multiple regression analysis tested the predictive effect of digital transformation on competitiveness. The regression model applied was:

$Y=\beta 0+\beta 1X1+\varepsilon$
Where:
Y = Competitive Advantage (Dependent Variable)
X_1 = Digital Transformation Initiatives (Independent Variable)
β_0 = Constant
$\beta 1$ = Regression Coefficient
ε = Error Term
Qualitative data from open-ended questions were analysed thematically and integrated with quantitative findings for triangulation. Results were presented using tables, charts, and narrative discussion.

FINDINGS

The study targeted 180 employees of Kenya Airways drawn from operations, customer service, IT, marketing, and corporate affairs departments. Out of the 180 questionnaires administered, 162 were completed and returned, representing a response rate of 90%. According to Mugenda and Mugenda (2019), a response rate of 50% is adequate, 70% is good, and 80% or more is excellent for analysis and reporting. Therefore, the 90% response rate achieved in this study was considered excellent and provided a reliable basis for data analysis. Respondents were asked to indicate their level of agreement with statements relating to the adoption of digital transformation initiatives at Kenya Airways. Table 1 presents the results.

Table 1: Descriptive Statistics on Digital Transformation Initiatives

Statement	Mean	Std. Dev	Interpretation
Kenya Airways has adopted mobile and web platforms for customer service.	4.21	0.76	Agree
Automation has enhanced operational efficiency at Kenya Airways.	4.05	0.81	Agree
AI and chatbots systems improve customer engagement.	3.98	0.88	Agree
Digital transformation has improved real-time communication with clients.	4.12	0.79	Agree
Overall, digital initiatives have strengthened competitive positioning.	4.15	0.82	Agree
Overall	**4.1**	**0.8**	

The results indicate that respondents generally agreed that digital transformation initiatives are being implemented at Kenya Airways. The highest-rated aspect was the adoption of mobile and web platforms (Mean = 4.21), while AI/chatbots recorded slightly lower agreement (Mean = 3.98), suggesting room for improvement in advanced automation.

Correlation Analysis

Correlation analysis was conducted to determine the relationship between digital transformation initiatives and competitive advantage.

Table 2: Correlation between Digital Transformation Initiatives and Competitive Advantage

Variable	Competitive Advantage
Digital Transformation Initiatives	**r = 0.748, p < 0.01**

The results show a strong, positive, and statistically significant correlation ($r = 0.748$, $p < 0.01$). This indicates that greater adoption of digital transformation initiatives is strongly associated with improved competitive advantage at Kenya Airways.

Regression Analysis

Regression analysis was performed to establish the predictive effect of digital transformation initiatives on competitive advantage.

Table 3: Regression Results for Digital Transformation Initiatives

Variable	Beta (β)	Std. Error	t-value	Sig. (p-value)
Digital Transformation Initiatives	0.328	0.054	6.074	0

DISCUSSION OF FINDINGS

The study revealed that digital transformation initiatives have a strong and statistically significant influence on competitive advantage at Kenya Airways. The descriptive results showed a high mean score (4.10) across items such as mobile/web platforms, automation, AI-driven tools, and digital communication. This indicates that respondents generally

perceived digital initiatives as essential for improving customer engagement, operational efficiency, and competitive positioning. The correlation analysis established a strong positive relationship ($r = 0.748$, $p < 0.01$), while the regression results demonstrated that digital transformation was the most significant predictor of competitive advantage ($\beta = 0.328$, $p < 0.001$), explaining nearly 56% of the variance. These findings suggest that digital adoption is not merely supportive, but central to the strategic competitiveness of Kenya Airways.

The findings are consistent with global evidence that digital transformation has become a critical determinant of organizational performance in the airline industry. Singh and Hess (2017) demonstrated that European airlines that adopted AI and mobile applications recorded enhanced agility and customer satisfaction. Similarly, Lee et al. (2020) confirmed that Asian carriers integrating predictive analytics and digital platforms achieved greater personalization, faster service delivery, and stronger competitive positioning. The results of this study align with such global trends, reinforcing the conclusion that digital innovation is a core driver of sustainable advantage in competitive aviation markets.

At the regional level, the findings corroborate studies such as Mwaura, Kamau, and Omondi (2022), who established that East African airlines implementing digital booking platforms and real-time flight tracking gained stronger customer loyalty and market presence. The current study extends these insights by showing that beyond customer satisfaction, digital transformation directly contributes to operational efficiency and brand competitiveness in the Kenyan context. This means Kenya Airways can achieve similar regional dominance as Ethiopian Airlines, provided it scales up its digital innovation initiatives.

In the Kenyan context, the results add depth to the work of Kariuki and Njoroge (2022), who found that mobile check-in systems and online platforms improved efficiency in local airlines but did not examine competitive advantage. Likewise, Musyoka and Kamau (2021) emphasized customer satisfaction from digital engagement without exploring its link to strategic competitiveness. By focusing on competitive advantage, this study fills both a contextual and conceptual gap, demonstrating that digital transformation initiatives at Kenya Airways not only improve efficiency and satisfaction but also enhance overall market positioning.

Despite these positive findings, the results also highlight gaps in the depth of Kenya Airways' digital adoption. For instance, while mobile and web platforms were widely recognized, advanced tools such as AI/chatbots recorded slightly lower means (3.98), suggesting partial or inconsistent adoption. Compared to global leaders like Delta and Lufthansa, which have successfully integrated biometric systems, predictive analytics, and AI-driven engagement across their operations, Kenya Airways still lags behind. This underscores the need for sustained investment in cutting-edge digital technologies to maximize the benefits of transformation.

Overall, the findings affirm the Technology Acceptance Model (TAM), which posits that perceived usefulness and ease of use of digital technologies drive adoption and, in turn, performance outcomes. At Kenya Airways, both employees and customers perceive digital initiatives as useful and manageable, leading to improved service delivery, loyalty, and

market competitiveness. The evidence therefore positions digital transformation not just as an operational enabler but as a strategic lever for achieving sustainable competitive advantage in Kenya's airline industry.

CONCLUSION

This study set out to examine the influence of digital transformation initiatives on competitive advantage in the airline industry, with a focus on Kenya Airways. The findings established that digital adoption has a strong and statistically significant effect on competitiveness, making it the most powerful predictor among the best practices considered in the broader research. Descriptive results revealed that the airline has moderately embraced mobile platforms, automation, and digital engagement tools, which respondents agreed had improved efficiency, service quality, and market positioning. Nevertheless, advanced technologies such as artificial intelligence and chatbots were rated slightly lower, suggesting that Kenya Airways has not fully leveraged the benefits of comprehensive digital transformation.

The correlation analysis demonstrated a strong positive association ($r = 0.748$, $p < 0.01$) between digital transformation and competitive advantage, while regression analysis confirmed that digital transformation explained nearly 56 percent of the variation in competitiveness ($\beta = 0.328$, $p < 0.001$). These results affirm the Technology Acceptance Model (TAM), which argues that perceived usefulness and perceived ease of use are critical in shaping technology adoption and performance outcomes. At Kenya Airways, both employees and customers perceived digital initiatives as valuable and manageable, which in turn enhanced efficiency, customer satisfaction, and loyalty. In conclusion, the study found that digital transformation is not simply a support mechanism for operations but a strategic driver of sustainable competitive advantage. For Kenya Airways, strengthening digital adoption is a critical pathway to improving profitability, enhancing customer experience, and consolidating its position in the regional and global aviation markets.

RECOMMENDATIONS

Drawing from the study's findings, it is recommended that Kenya Airways deepen its investment in advanced digital technologies such as artificial intelligence, predictive analytics, and chatbots systems. These innovations would enhance personalization, improve real-time decision-making, and strengthen customer engagement, thereby allowing the airline to compete more effectively with leading global carriers. The airline should also expand automation beyond customer-facing platforms to include back-office operations such as scheduling, maintenance, and supply chain management. Doing so would reduce operational costs, minimize errors, and boost efficiency across the organization.

In addition, Kenya Airways should enhance staff digital training and capacity building. Successful adoption of new technologies requires employees to have adequate knowledge and skills, and continuous training would ensure that digital systems are utilized effectively while minimizing resistance to change. The airline should also consider developing innovation hubs or cross-functional teams tasked with piloting and testing new technologies, which would foster a culture of creativity and adaptability in the organization.

Finally, policy support and strategic partnerships will be essential to sustaining digital transformation efforts. Kenya Airways should work closely with regulators such as the Kenya Civil Aviation Authority, as well as technology providers and strategic partners, to create an enabling environment for innovation. By leveraging partnerships, the airline can access new tools, expertise, and funding, which would accelerate the implementation of large-scale digital transformation projects.

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